

Manipulative skills in chemistry internal assessment

Manipulative skills are assessed summatively. This means that one overall mark will be given. The skills assessed should cover most of the two-year course, and the mark given should reflect the student's general ability near the end of the course. This mark is not an average nor does it relate to a given investigation. It is important therefore that the scheme of work sets the students a variety of tasks and that they carry out a range of different techniques. The examples below are suggestions to aid assessment of manipulative skills and are not considered to be a prescribed list.

Note: No supporting evidence is required for moderation of manipulative skills.

Aspect 1: Following instructions

The student:

- reads/listens to instructions before asking for help
- only starts the investigation after having read/listened to all the instructions
- is able to follow a sequence of several written or verbal instructions with little assistance.

Aspect 2: Carrying out techniques

Measuring volume

The student:

- uses a suitable cylinder/pipette/burette size
- does not overfill cylinder/pipette/burette
- places his/her eyes at the height of the meniscus.

Measuring mass

The student:

- handles the balance appropriately when transporting it
- adjusts the balance to zero before starting
- uses a suitable container for the substance to be measured.

Measuring temperature

The student:

- leaves his/her thermometer in a safe place when it is not in use
- refrains from touching the sides of the container with the thermometer when measuring the temperature of a liquid
- leaves the thermometer in the liquid when measuring the temperature of that liquid.

(Vacuum) filtering

The student:

- folds/places the filter paper correctly
- uses equipment/filter paper of adequate size
- adds a reasonable amount of liquid to the funnel.

Making solutions

The student:

- uses a funnel to add the solid to the volumetric flask
- washes the container containing the solid several times and adds the water to the volumetric flask
- carefully adds water to the mark.

Titration

The student:

- makes one trial before taking measurements
- takes at least three measurements
- takes care towards the end of the titration.

Assembling equipment

The student:

- ensures that different parts are clamped safely together without forcing the glass
- uses anti-bumping granules for boiling liquid
- chooses the correct size/shape of flasks
- places the thermometer at an adequate height
- connects the cooling water adequately.

Collection of gas

The student:

- takes care that the assembly is airtight
- takes care that the equipment does not contain air before starting.

Setting up electrical circuits

The student:

- connects up a circuit without help
- connects the ammeter in series and the voltmeter in parallel
- connects the positive side of the ammeter/voltmeter to the positive side of the power supply
- uses a suitable scale.

Aspect 3: Working safely

The student:

- always wears safety clothing appropriate to the task, such as eye protection, lab coats and gloves
- pays proper attention to written or verbal safety instructions and hazard symbols
- lights and uses the Bunsen burner safely
- places flammable substances far away from flames
- takes care, when heating, that the test tube does not point at other students
- takes care that the test-tube holders are not in the flame
- ensures that solutions are not heated to complete dryness
- places hot equipment on heat mats
- uses the fume cupboard for all poisonous volatile liquids
- washes his/her hands after using toxic substances in the laboratory
- takes care not to mix spatulas for different chemicals, or caps off different bottles
- leaves glassware on solid surfaces and ensures that glassware cannot be knocked or roll off the surface
- reports when equipment has been broken
- avoids wasting chemicals
- cleans spilled chemicals or broken glassware immediately
- washes and tidies up the equipment after use
- disposes of chemicals in a suitable manner
- shows awareness of the impact of chemicals on the environment.